

San Francisco Canal
Between 40th Street and Weir Avenue
and 36th Street and Roeser Road
Phoenix
Maricopa County
Phoenix

HAER No. AZ-8

HAER
ARIZ.
7-PHEN,
14 -

PHOTOGRAPHS

WRITTEN HISTORICAL AND DESCRIPTIVE DATA

Historic American Engineering Record
National Park Service
Western Region
Department of the Interior
San Francisco, California 94102

HISTORIC AMERICAN ENGINEERING RECORD

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San Francisco Canal

HAER No. AZ-8

Location: Between 40th Street and Weir Avenue and 36th Street
and Roeser Road
Phoenix, Maricopa County, Arizona

Date of Construction: 1871. Broadened, deepened and lengthened in the
mid-1870s

Present Owner: United States of America. Administratively controlled
by the Salt River Project

Present Use: In use. Although portions of the canal are unlined,
it still carries water to south Tempe for use in urban
irrigation.

Significance: The San Francisco Canal was one of the first few
operating irrigation ditches in the Salt River
Valley. It was the only privately-owned canal south
of the Salt River and, after 1901, it was the
principle water source for the seven thousand-acre
Bartlett-Heard Land and Cattle Company. The canal
continues to serve residential Tempe. It originally
had its head constructed on the south side of the Salt
River, approximately one mile below the milling town
of Tempe, Arizona. The canal flowed 3.25 miles in a
southerly direction, and then divided into the north
and south branches. The north branch extended along
the Salt River in a westerly direction, and the south
branch extended in a southwesterly direction.

Historian: Jay C. Ziemann, Salt River Project Archives

Edited, Retyped
and Transmitted by: Jean P. Yearby, HAER, 1987

THE SAN FRANCISCO CANAL

In the middle of the 19th century, the land surrounding and including the Salt River Valley in Arizona, located in the south-central portion of the state, was typical of the desert southwest. Receiving less than six inches of rain annually, the arid soil and extreme summer temperatures did not initially attract settlers of the westward movement. Other than a few scattered Indian tribes that used the Valley as part of their hunting and foraging grounds, the land upon which the City of Phoenix would ultimately grow and prosper was a desolate, untamed and barren stretch of ground.

The outbreak of the American Civil War created an immediate need for experienced military men in the East, and the few United States Army troops in Arizona were pulled out. This created havoc in the territory. The Apache Indians perceived the desertion of the territory by the Army as an acknowledgement of defeat. In the following months the Apache raids became increasingly bold, forcing the majority of the white population to leave Arizona. The establishment of Fort McDowell in 1865, located on the Verde River just to the east of Phoenix, returned some stability to the territory. As settlers began to reappear in the Salt River Valley in the late 1860s, they found rich soil and a climate that would allow year-round cultivation of crops. They also found a climate that was so arid that crops would not grow without the artificial application of water. Not until

the realization of an irrigation system would permanent settlement be possible. Through private funding and community work, the Valley's population went from two hundred thirty-five (235) in 1870, to over eleven thousand (11,000) in 1890.¹

Despite the harshness of the Arizona desert, the first visitors to this region found that the dry and warm climate also had very advantageous medicinal qualities, improving the comfort of those afflicted with heart and respiratory ailments. Those who came to the Valley to farm and restore their health began to investigate and invest large sums of money in irrigation projects that would reclaim the lands of the Salt River Valley from the desert. The San Francisco Canal was one of these early projects.

¹For general works concerning the Salt River Valley and the Salt River Project, see Karen L. Smith, "From Town to City: A History of Phoenix, Arizona, 1870-1912," (M.A. thesis: University of California, Santa Barbara, 1978), Karen L. Smith, The Magnificent Experiment: Building the Salt River Reclamation Project, 1890-1917 (The University of Arizona Press, Tucson, 1986), Geoffrey P. Mawn, "Phoenix, Arizona: Central City of the Southwest, 1870-1920," (Ph.D. dissertation: Arizona State University, 1979) and Christine Lewis, "A History of Irrigation in the Tempe Area," (M.A. Thesis: Arizona State University, 1963).

The origins of the San Francisco Canal, or the Mexican Ditch as it was originally and commonly called, are to some degree a mystery.² In the months immediately following the commencement of the building of the Swilling Ditch in 1870, the first non-Indian canal constructed in the Valley, work began on the San Francisco Canal in 1870-1871.³ The initial digging was begun in late 1870. The San Francisco Canal was the second canal started near the small town of Tempe, Arizona, one of the oldest and most extensively irrigated areas in the Valley, following another small agricultural irrigation trench called the Kirkland and McKinney Ditch.⁴

The San Francisco Canal was constructed by white and Mexican settlers, using largely Mexican laborers for the gruelling work.⁵ The canal was dug by hand in the adobe soil on the south side of the Salt River and travelled roughly in a south-westerly direction. The head of the canal was located approximately one mile below, or to the southwest of

²Earl Zarbin, "Salt River Valley Canals: 1867-1875." This is the unpublished text from a presentation that Mr. Zarbin gave on January 14, 1980, to the Salt River Project. Salt River Project Archives, Article File.

³Joseph H. Kibbey, "Brief on Articles of Incorporation Dated May 25, 1903." This is a brief Judge Kibbey wrote for the Salt River Valley Water Users' Association. A copy can be found in box 5042, control 450, of the Salt River Project Archives.

⁴Earl Zarbin, "Salt River Valley Canals: 1867-1875."

⁵H. J. Lawson to John C. Page, 20 May 1940, box 5013, control 160, Salt River Project Archives. Mr. Lawson provided the Commissioner of Reclamation various information concerning the names of several towns, dams and canals located in the Salt River Valley.

the town of Tempe.⁶ The San Francisco Canal was the smallest of the southside canals. Originally, the canal received all of its water directly from the Salt River through this wooden headgate.⁷

A few years after the construction of the canal was begun, the settlers diverted water from the Tempe Canal, which was then supplying water for the Hayden Mill in south Tempe. At times of exceptionally high water, the canal would still receive some water directly from the Salt River. However, the great majority of the water apportioned to the San Francisco Canal was diverted from the larger Tempe Canal.⁸ Thus the smallest of the southside canals was constructed and apportioned water.

The Mexican grain farmers of the area, who were predominantly responsible for the labor that dug the original ditch, named the canal after the patron saint of the Mexicans, St. Francis. The farmers, who were devout Catholics, hoped that by so naming the canal it would always carry plenty of life-giving water to their lands.⁹

⁶"Valley Canals (1867-1892)." These brief descriptions of the Valley canals as of 1915, can be found in box 5041, control 430.8, Salt River Project Archives.

⁷U. S. Reclamation Service, Salt River Project Arizona, Final History to 1916, 3 vols., p. 6. Salt River Project Archives.

⁸This information was found in many places in the Salt River Project Archives. See especially, Alfred T. McClatchie, "Utilizing Our Water Supply," University of Arizona Agricultural Experiment Station Bulletin, No. 43, (Tucson: University of Arizona) July 28, 1902, p. 92, Geoffrey P. Mawn, "Phoenix, Arizona: Central City of the Southwest, 1870-1920," p. 44, and Christine Lewis, "A History of Irrigation in the Tempe Area," p. 33.

⁹H. J. Lawson to John C. Page, 20 May 1940.

Despite the presence of the new irrigation water, these Mexican farmers continued to experience economic hardships in the early years of the 1870s. Between financing the costs incurred in constructing and maintaining the canal, and selling their meager crops on the depressed farm markets, the farmers fell further into debt. In May of 1873 a man named Michael Wormser began to enter into financial deals structured much like those of European feudal times, with these farmers who held lands adjacent to the San Francisco Canal.¹⁰

Michael Wormser was born on June 27, 1827, at Mittelbronn in the department of Moselle, Lorraine, France. He was the first son and possibly the first child born to Isaac and Madeline (Levy) Wormser. As a boy he spoke Yiddish at home.¹¹ In 1857 at the age of thirty, Wormser was a short, fat, balding, unmarried, and poor man. Having greater expectations for his future than those open to him at home, he decided to leave his family in France and follow his first, younger cousin and emigrate to the United States. Early in 1858 Wormser landed in New York City with fifteen dollars in his pocket. For the next twenty years, he perceived himself as a foreigner on American soil who always had plans to return to his family and his native France. It was not until after 1870, and after France's crushing military defeat at the hands of the Prussians,

¹⁰Richard B. Goldberg, "Michael Wormser, Capitalist," American Jewish Archives (November 1973), p. 185.

¹¹Ibid. p. 163.

that he decided to stay in the United States and become an American citizen.¹²

Upon landing in New York, Wormser sought out his cousin, Ben Block, who had followed the Gold Rush to California. Wormser began by working as a stable-boy in Block's livery stable, but that business failed shortly after Wormser's arrival. He then began successfully to peddle goods to the miners in the San Luis Obispo area.¹³

Michael Wormser made his way to Arizona for the first time in 1863, when gold was discovered at Weaver Gulch near present day Wickenburg. He first tried his hand at mining for gold, but finding that to be unsuccessful and extremely hard work, he returned to storekeeping in Prescott.¹⁴ On March 15, 1873,¹⁵ Wormser left the Prescott area, where he and Ben Block had opened a general store, and moved to the Salt River Valley to open his newest store in the town of Phoenix. He and a partner named Wertheimer started in an adobe building at what is now the corner of Jefferson Street and North Central Avenue. Eight months later, Wertheimer was dead of stomach cancer and Wormser was making a very successful income as the sole proprietor of the little store.¹⁶

¹²Ibid. p. 164.

¹³Ibid. p. 166.

¹⁴Ibid. p. 171.

¹⁵Ibid. p. 181. See also Christine Lewis, "A History of Irrigation in the Tempe Area," p. 34.

¹⁶Richard B. Goldberg, "Michael Wormser, Capitalist," p. 181.

Earlier, in January 1873, Wormser's cousin, and his new business partner, Aaron Barnett, moved to the Salt River Valley and began to buy small parcels of land along the narrow and badly maintained irrigation ditch known as the Mexican or San Francisco Canal.¹⁷ They persuaded Michael Wormser to invest some of his retail earnings on the agricultural lands south of the Salt River. These men were less interested in farming, however, than they were in land speculation.

In order for the investors to realize a profit in this venture, the Mexican farmers surrounding the canal would have to be productive. In order to attract future buyers, full stands of healthy crops would need to flourish in the fields. Unfortunately for Wormser, the Mexicans were in such bad financial straits that they could not even afford the seed to plant the crop. Thus in May of 1873, Wormser entered into his first agricultural contract with these poor farmers. Wormser would supply the seed and provisions necessary to sow and harvest a crop, and in return he would retain a mortgage on the Mexican's crop. Wormser's terms were for each sack of seed that he furnished, the farmers were to repay him with two sacks of grain.¹⁸ Therefore, at harvest time, the Mexican farmers were obliged to give to Wormser the first of their threshed wheat or barley that was produced. Wormser would then resell the grain at a profit. If a farmer ever refused or was delinquent in his payments, Wormser would

¹⁷Ibid. p. 185.

¹⁸Christine Lewis, "A History of Irrigation in the Tempe Area," p. 34.

either seize the grain, or sue the farmer; the latter was apparently Wormser's favorite solution.

This arrangement worked fine for Wormser, but only for a short period of time. Despite the presence of irrigation waters from the San Francisco Canal, the sandy soil and the continued economic conditions of the farmers combined to make this contract very insecure. The canal fell into a state of disrepair as the farmers could not afford to maintain it, and the amount of money that the farmers owed to Wormser increased. Never one to miss a chance to increase further the size of his personal pocketbook, Wormser decided to take advantage of the situation. He insisted that the Mexicans get legal title to their lands, and he then purchased those lands for the amount that each individual farmer owed him.¹⁹ Thus he acquired approximately nine thousand acres of agricultural land around the town of Tempe, as well as the San Francisco Canal itself.

As the owner and operator of the San Francisco Canal,²⁰ or Wormser's Ditch as it was sometimes called during this period,²¹ Michael Wormser realized that his newly acquired land was worthless if it was not properly irrigated. To ensure a more stable water supply, Wormser immediately contracted for repair work to be done. During 1874, the San

¹⁹Richard Goldberg, "Michael Wormser, Capitalist," p. 185.

²⁰Ibid.

²¹Alfred J. McClatchie, "Utilizing Our Water Supply," p. 83.

Francisco Canal was broadened, deepened and expanded so as to be more efficient in its task.²²

To further guarantee his supply of water, Wormser dealt heavily in canal shares. In addition to his total, personal and private ownership of the San Francisco Canal, which was unique in the Valley, he also owned thirteen and one-half shares out of a possible one hundred-nine outstanding shares of the Tempe Irrigating Canal Company.²³ This gave Wormser a significant minority holding in the company owning and operating the Tempe Canal, which directly fed his own San Francisco Canal.

Due to the maintenance work, the San Francisco Canal was now capable of irrigating approximately four thousand acres of land.²⁴ Although Michael Wormser owned more than two times that amount of acreage, much of it was far enough away from the San Francisco Canal so as to make it uneconomical to irrigate it that way. On the other hand, Wormser's improvements to the canal allowed him to pump an excess amount of water to his lands south of Tempe, which could not be irrigated by gravity flow from his canal. The total length of the canal was now near twelve miles, its maximum bed width was nine feet, the average slope/mile was two and one-half feet (2.50), and its maximum capacity was fifty cubic

²²Richard B. Goldberg, "Michael Wormser, Capitalist," p. 186.

²³Ibid.

²⁴Ibid., p. 187.

feet/second.²⁵ Wormser claimed a right to five thousand miners' inches of water per year through the canal.²⁶ This was more water than Wormser needed personally for his lands because he reportedly sold his excess water, as was the general custom in the Salt River Valley, at a rate of six hundred dollars for thirty acre feet.²⁷

By 1876, Wormser had left the retail business to take up farming along his San Francisco Canal. He had much better steady financial luck in this endeavor.²⁸ For approximately the next decade, Michael Wormser successfully raised small grains in the reclaimed soil and continued to prosper financially.

Throughout the 1880s, as settlement increased and more canals were constructed along the banks of the Salt River, the farmers viewed with alarm the state of the dwindling water supply. In 1883 the Arizona Canal Company was organized along the north side of the river. It began a diversion dam further upstream than the headgates of the older canals,

²⁵U. S. Department of Agriculture, "Irrigation in the Salt River Valley." Report of Irrigation Investigations for 1900. A copy of this report can be found in box 5013, control 160, of the Salt River Project Archives.

²⁶Elwood Mead, "Report of Irrigation Investigations for 1900," (Washington, D.C.: Government Printing Office), 1902, p. 86.

²⁷Christine Lewis, "A History of Irrigation in the Tempe Area," p. 35.

²⁸Christine Lewis, "The Early History of the Tempe Canal Company," Arizona and the West, vol. 7, No. 3 (Autumn 1965), p. 234. A complete set of Arizona and the West is available in the Library of the Salt River Project Archives.

and announced its intentions to appropriate fifty thousand (50,000) miners' inches of water annually.²⁹ On February 7, 1887, in order to protect their "vested interests," Michael Wormser, as a stockholder in the Tempe Canal Company as well as the owner of the San Francisco Canal, along with the owners of the Salt River Valley, Maricopa, Mesa, Tempe, Grand and Utah canals, sued the Arizona Canal Company. The Arizona Canal Company reassured residents of the Salt River Valley that there would be plenty of water for all, but the plaintiffs brought suit anyway.³⁰ Before the case came to trial, in March of 1890, it was amended five separate times, and the only plaintiffs that remained steadfast to the case were the owners of the Tempe Canal and Michael Wormser.³¹ The case resulted in the famed Kibbey decision, which formally appropriated specific amounts of water to the various canals in the valley. The court also declared that water rights were appurtenant to the land. In regards to the San Francisco Canal, Judge Kibbey wrote the following:

In 1874 and '75 (sic) the construction of a ditch on the south side of the river emerging therefrom about a mile above the head of the Salt River Valley Canal, was begun, and since that time has been constructed, repaired and probably enlarged, which ditch has become known as the San Francisco Canal and is, with its alleged incidental rights to divert water from the

²⁹Richard B. Goldberg, "Michael Wormser, Capitalist," p. 184.

³⁰Christine Lewis, "The Early History of the Tempe Canal Company," p. 235-237.

³¹Ibid., p. 236.

Salt River, claimed by Mr. Wormser . . .³²

Because of his stature within the community as a large land owner and successful farmer, and his interest in the economic well-being of the Valley that he now called home, Wormser entered local politics. In November 1880, he was elected to the Maricopa County Board of Supervisors. Wormser tended to be conservative in his political outlook and was, in character, pledged to fiscal responsibility for the County. It appeared Wormser's ultimate political creed, however, was that what was good for Michael Wormser was good for the Salt River Valley.³³

Wormser suffered a paralytic stroke in 1892 and his health gradually deteriorated until he died on April 25, 1898, at the age of seventy.³⁴

He was frequently described as the embodiment of the spirit of frontier materialism and it was, to a noted degree, his tremendous creative talent that helped to build the financial viability of Arizona, especially the Salt River Valley.³⁵

At the time of his death, Wormser was regarded as one of the wealthiest men in all of Arizona. A special administrator was assigned to

³²Earl Zarbin, "Phoenix: The Reservoir Chase before June 17, 1902." This unpublished manuscript is available in the Salt River Project Archives Article File.

³³Wormser v. The Salt River Valley Canal Company, Case No. 708. Decision by Judge Joseph H. Kibbey, handed down March 31, 1892. A full copy of the famed Kibbey decision can be found in box 5001, control 110.01 of the Salt River Project Archives.

³⁴Richard B. Goldberg, "Michael Wormser, Capitalist." p. 194.

³⁵*Ibid.*, p. 200.

quiet the estate, and he discovered that Wormser was obviously loathe to write anything down. Many of his business transactions were never recorded and he never left a will. His estate was appraised between \$276,000 and \$400,000, including the nine thousand acres of land south of Tempe and the San Francisco Canal.³⁶ At the time of Wormser's death, the canal was valued at \$50,000. In order to transform the Wormser holdings into liquid assets, the administrator was forced to sell the property that Wormser had accumulated. The main portion of this land, six thousand seventy (6,070) acres along the south bank of the Salt River, was purchased for \$132,088 by Mr. Dwight B. Heard for a Chicago syndicate headed by A. C. Bartlett.³⁷ It served as the nucleus for the Bartlett-Heard Land and Cattle Company.³⁸

Heard was born in Boston on May 1, 1869. He was raised in New England, but in 1886, he moved west to Chicago to begin his business career. He joined with a large wholesale hardware firm named Hibbard, Spencer, Bartlett and Company. After a number of successful years with the firm, Heard was forced to retire in 1894 due to a lung illness. He married the partner Bartlett's daughter Maie, and in an effort to regain

³⁶Ibid., p. 162-163.

³⁷Christine Lewis, "A History of Irrigation in the Tempe Area." p. 35.

³⁸Richard B. Goldberg, "Michael Wormser, Capitalist," p. 201-202.

his health, the newlywed couple moved to the panhandle of Texas.³⁹ During the winter of 1895-96, Dwight Heard came to the City of Phoenix for the first time.⁴⁰ Although he and his wife returned to Texas for a short while, Heard found the arid Arizona climate was especially comforting to his weakened lungs, and the couple moved to Phoenix to stay in 1897.

Having been a successful businessman in Chicago, it was understandable that Heard would soon begin some venture in Phoenix, and he opened a real estate office and an insurance and loan business once settled in the Valley.⁴¹ As an Easterner and a relatively poor horseman, it was somewhat of a surprise, however, that he invested in a forty-acre ranch some six miles from Phoenix. During the next couple of years, Heard bought three more ranches on the north side of the Salt River accumulating some five hundred fifty (550) acres.⁴²

Adolphus C. Bartlett's interest in the Salt River Valley and the City of Phoenix appeared to be limited to his daughter and son-in-law, Dwight B. Heard. When Heard arrived in Phoenix, he agreed to invest some of Bartlett's money in real estate in and around the city. For Bartlett, he

³⁹Geoffrey P. Mawn, "Phoenix, Arizona: Central City of the Southwest, 1870-1920," p. 237.

⁴⁰Earl Zarbin, "Phoenix: The Great Reservoir Chase before June 17, 1902," p. 13.

⁴¹Geoffrey P. Mawn, "Phoenix, Arizona: Central City of the Southwest, 1870-1920," p. 237.

⁴²A. C. Bartlett to Kohlsaatt, 16 February 1903. A copy of this letter may be found in box 5013, control 160 of the Salt River Project Archives.

bought numerous city lots and a one hundred sixty (160) acre plot of agricultural land not far outside the city limits.⁴³

Heard made his biggest purchase for Bartlett in 1900 when he bought the six thousand seventy (6,070) acres of property south of the Salt River from the estate of Michael Wormser for \$132,088.⁴⁴

In a letter to a friend by the name of Kohlsaas, Bartlett indicated his plans:

A few years ago Mr. Heard and I bought of an estate the property lying on the south side of the river, containing about seven thousand acres, (including the title to the San Francisco Canal) formed the Bartlett-Heard Land and Cattle Company and are farming the tract.⁴⁵

Dwight Heard served as the Vice President and General Manager of the company as well as the resident member of the owning partnership. A. C. Bartlett remained in Chicago and continued to do business for his hardware firm.⁴⁶

⁴³Ibid.

⁴⁴Geoffrey P. Mawn, "Phoenix, Arizona: Central City of the Southwest, 1870-1920," p. 238. A copy of this contract can be seen in the files in the Arizona Room of the Phoenix Public Library, Phoenix, Arizona.

⁴⁵A. C. Bartlett to Kohlsaas, 16 February 1903.

⁴⁶Earl Zarbin, "Dwight B. Heard: 'A Public Enemy.'" A copy of this unpublished manuscript can be seen in the Article File of the Salt River Project Archives. See also, A. C. Bartlett to Charles O. Walcott, 16 March 1903. Charles Walcott was the Director of the United States Geological Survey and Bartlett wrote the letter to explain his business interest in Arizona. A copy of the letter is available in box 5013, control 160, of the Salt River Project Archives.

The Bartlett-Heard ranch stretched from 48th Street on the east, to 7th Avenue on the west, and from the bed of the Salt River on the north, to the foothills of the South Mountains. On this huge expanse of arid desert land, Dwight Heard very boldly proposed to build a model ranch for the United States and the world to copy.⁴⁷

It would have been impossible for the Bartlett-Heard ranch to survive, let alone become any sort of a model, without the life-giving water that flowed to the land through the San Francisco Canal. Earlier court cases recognized "the exclusive right to and ownership of the water diverted by the canal," and that "the title to the water and the right to its use are identical . . .,"⁴⁸ These water rights guaranteed the viability of Bartlett-Heard Land and Cattle Company.

By 1900, when Heard bought the canal from the Wormser estate, the canal's length and direction had been dug to its final, completed state. Specifically, the San Francisco Canal flowed from the south bank of the Salt River at Hayden Mill in Section 15, T. 1 North, Range 4 East, Gila and Salt River Base line and Meridian; the main canal extended from that point to a point near the center of Section 19-1N-4E, where it divides into

⁴⁷"American Community in the Making," Arizona Magazine, March 1911, p. 14-17. In the early 20th Century there were a number of publications entitled Arizona or Arizona Magazine. A bound copy of this particular oversized magazine was found in the Arizona Room of the Phoenix Public Library, Phoenix, Arizona.

⁴⁸William A. Hancock, "Something About Water; The Right to the Use of Water for Irrigation in Arizona." (Phoenix, Dunbar Printers). This article was published sometime early in the 20th Century and is available at the Salt River Project Archives.

the North and South branches; the North Branch extended along the Salt in a westerly direction to the east side of Central Avenue in Section 20-1N-3E; and the South Branch extended in a south-westerly direction to the east side of Central Avenue in Section 32-1N-3E.⁴⁹

Like Wormser, Dwight Heard forged a prominent role within the Salt River Valley community, and became involved in the issues that were vital to the area. In 1902, Heard was the National Irrigation Association representative in Phoenix.⁵⁰ In June of the same year, Heard was a part of the Maricopa County Water Storage Commission's delegation to Washington, D.C. to watch President Theodore Roosevelt sign the National Reclamation Act into law.⁵¹

Heard also was very involved in the water storage movement, taking an unpopular stand against the articles of incorporation that created the Salt River Valley Water Users' Association in November of 1902.⁵² Heard believed that the articles of incorporation failed to adequately reflect the will of the Conference Committee, in which he also participated. Heard refused to sign the articles, and he withheld the Bartlett-Heard lands

⁴⁹U. S. Reclamation Service, Salt River Project Arizona, Final History to 1916, 3 vols., p. 395.

⁵⁰Earl Zarbin, "Phoenix: The Reservoir Chase Before June 17, 1902," p. 22.

⁵¹Earl Zarbin, "Dwight B. Heard: 'A Public Enemy,'" p.2.

⁵²*Ibid.*, p. 4.

under the San Francisco Canal from the Water Users' Association and from the Salt River Reclamation Project.⁵³

Both A. C. Bartlett and Dwight Heard realized that they were in a very difficult situation. The public, especially the Phoenix press, cried against what they perceived as a desertion from their united front in a drive for federal reclamation money. In an attempt to quiet this criticism, Heard wrote a letter to the editor of the Phoenix Enterprise on June 3, 1903. He said, in part, that, "[t]he Bartlett-Heard Land and Cattle Company have always been glad and willing to do everything in their power to assist in the cause of water storage, and would not do anything to retard this movement."⁵⁴ On the other hand, Bartlett recognized the impossibility of subscribing the ranch land to the Reclamation Act, for, "[t]he law does not permit us to subscribe this [southside] property under the storage plan authorized by congress because the limit permitted by law is 160 acres."⁵⁵ Of course, the Bartlett-Heard Land and Cattle Company contained over six thousand acres. Ultimately, Dwight Heard decided to retain the unity of his model ranch and refrained from signing the articles of incorporation for the Salt River Valley Water Users' Association.

⁵³Ibid., p. 11-12.

⁵⁴Dwight B. Heard, "D. B. Heard's Explanation," The Phoenix Enterprise 3 June 1903. A copy of Heard's letter to the editor of the Enterprise in which he presents his side of the Tonto Reservoir storage controversy is available in box 5012, control 150.8 of the Salt River Project Archives.

⁵⁵A. C. Bartlett to Kohlsaas, 16 February 1903.

Despite occasional administrative problems, the Bartlett-Heard Ranch, headquartered in a rambling house at 24th Street and Broadway, enjoyed unhoped for success. The superintendent of the ranch, Laurens Lassar, oversaw the most successful large ranch of its type in the Salt River Valley. Alfalfa was the primary crop grown. After surveying the four thousand acres of Bartlett-Heard alfalfa, government agricultural experts proclaimed it to be the "finest and largest body of clean, irrigated alfalfa in the United States."⁵⁶ Among the other grains that were grown were oats, wheat, corn, sorghum and barley. Citrus was first grown at Bartlett-Heard in 1913. The fruits and vegetables that were successfully raised were oranges, pomelo, dates, pears, almonds, olives, apricots, figs, peaches, plums, grapes, grapefruit, cantaloupes and beets.⁵⁷ Bees were kept so that there would be fresh honey. Many acres of cotton were also harvested. Not surprisingly, the Bartlett-Heard Ranch also raised livestock for work, by-products and the butcher. Durham and Hereford cattle were brought from the East. The Durham cattle were reportedly less hardy in taking to the desert climate, but a Durham-Hereford cross did quite well. Horses and mules, hogs, sheep and poultry were also raised on the ranch.⁵⁸

⁵⁶"American Community in the Making," Arizona Magazine, March 1911, p. 14-17.

⁵⁷Ibid.

⁵⁸Ibid.

Dwight Heard was most interested in retaining the Bartlett-Heard holdings intact and to continue to develop his model ranch, but the pressure to subdivide the ranch into one hundred sixty (160) acre plots that would be able to meet the conditions of the Reclamation Act grew steadily each year.⁵⁹ In 1910, when there were only four homes located on the six thousand plus acre ranch, Louis C. Hill, the supervising engineer for the Salt River Reclamation Project, approached Dwight Heard with the subdivision idea. Heard agreed, providing that the Reclamation Project would purchase the San Francisco Canal from him.

As negotiations for the sale began, the face of the Bartlett-Heard Ranch changed dramatically. Louis Janssens, a "young capable man," led one of the first contingencies to move onto the ranch. Janssens' Belgian group bought two hundred thirty (230) acres of land in 1910. They promptly invested some \$100,000 in a herd of ostriches. Ostrich farming was very popular in the Valley at this time due to the high demand of the birds' feathers by the fashion industry. In 1910, there were more ostriches to be found in the Salt River Valley than anywhere on earth, save the plains of South Africa.⁶⁰ These Belgians eventually built up the second largest ostrich farm, in terms of land and number of birds, in the

⁵⁹U. S. Reclamation Service, Salt River Project Arizona, Final History to 1916, 3 vols., p. 395.

⁶⁰"American Community in the Making," Arizona Magazine, March 1911, p. 14-17.

Salt River Valley.⁶¹ There were a number of reported problems with raising the ostriches. The birds apparently scared the horses to death, and they frequently broke through or jumped over their fences and had to be rounded up in the streets of Tempe. After World War One, ostrich plumes lost their fashion vogue and soon afterwards the birds disappeared from the Bartlett-Heard Ranch.

By the time that the Roosevelt Dam was completed in 1911, only the lands under the Tempe, Broadway, Utah and San Francisco canals were left outside of the project.⁶² By March of 1911, negotiations between Bartlett-Heard and the United States Reclamation Service, which had begun in 1907,⁶³ had resulted in a \$12,840 sale price for the San Francisco Canal.⁶⁴ The deed that transferred the canal from the Bartlett-Heard Land and Cattle Company to the United States was executed on December 31, 1912. The Reclamation Service commenced operation of the canal at midnight, January 1, 1913.⁶⁵

⁶¹Geoffrey P. Mawn, "Phoenix, Arizona: Central City of the Southwest, 1870-1920," p. 280.

⁶²Christine Lewis, "A History of Irrigation in the Tempe Area," p. 80.

⁶³U. S. Reclamation Service, Salt River Project Arizona, Final History to 1916 3 vols., p. 395.

⁶⁴Ibid.

⁶⁵Ibid., p. 396. This is a copy of the actual contract that transferred the San Francisco Canal from the Bartlett-Heard Land and Cattle Company to the United States.

Acting on the anticipation of acquiring the San Francisco Canal, as well as the land immediately surrounding the canal, the Reclamation Service undertook a well drilling project and the construction of a pumping plant. These projects would give greater insurance that the canal would always carry a sufficient quantity of water. In the years previous to 1911, the Bartlett-Heard people had, at various times, attempted to drill wells at the new pumping plant site, but due to a number of difficulties, had given up on the jobs. The government had better luck. Between May 16 and September 1, 1911, the Reclamation Service drilled six wells at a total depth of eight hundred sixty-five (865) feet.⁶⁶ The San Francisco Pumping Plant was constructed on 2/3 of an acre of ground in the southeast quarter section 18-1N-4E.⁶⁷ The plant was completed on October 11, 1911.⁶⁸ The projects were quite successful, as the Salt River Project's twelfth annual report noted, "The gravity supply has been materially augmented by the five batteries in operation south of Mesa and the San Francisco well, which has served materially in furnishing adequate water to the San Francisco system."⁶⁹

⁶⁶Ibid., p. 567.

⁶⁷Ibid., p. 395.

⁶⁸U. S. Reclamation Service, 15th Annual Report, 1915-1916 (Washington D.C., Government Printing Office) 1916, p. 49.

⁶⁹U. S. Reclamation Service, 12th Annual Report, 1912-1913 (Washington D.C., Government Printing Office) 1913, p. 54.

After 1913, Dwight B. Heard continued to play an influential role within the Salt River Community. He continued to earn a most comfortable living by subdividing his farm, and raising cotton and citrus. In order to give voice to the Progressive views that he subscribed to, he bought the Arizona Republican newspaper and served as its publisher and president. Always seemingly on the leading edge of a trend, the Dwight Heards' were the first two car family in the City of Phoenix.⁷⁰

Historian John R. Murdock has said that, "[i]n sober truth, Dwight B. Heard ought to be listed among the half dozen great Americans who are responsible for the extensive achievement of conservation and reclamation throughout the West."⁷¹

The San Francisco Canal has continued to serve portions of Tempe on an "as need" basis. The majority of the canal is now piped and underground, but sections of the unlined ditch can still be seen carrying the same life-giving water to new Valley residents.

⁷⁰Geoffrey P. Mawn, "Phoenix, Arizona: Central City of the Southwest, 1870-1920," p. 313.

⁷¹Earl Zarbin, "Dwight B. Heard: A Public Enemy," p. 1.

The dream of bountiful crops growing along the south banks of the Salt River was originally pursued by a small group of Mexican farmers. Their back-breaking efforts made the San Francisco Canal a tangible reality. Under the control of men like Michael Wormser and Dwight B. Heard, the artificial application of water to the desert soil became more technologically efficient, and economically feasible.

Yet, despite what appeared at the time to be modernizing efforts, the San Francisco Canal was still an unlined ditch, plagued by seepage and evaporation problems. Silt accumulated at the base of its crude wooden gates causing flooding along the banks. High water in the river would frequently wash out the canal headings. These problems seemed to be recurring nightmares for the developers of the Salt River Valley in the 1870s and 1880s.

Curiously, in the New England region of the country, from which a significant number of the Salt River Valley residents had immigrated, problems like these had been solved decades before. In 1819, the State of New York undertook the most ambitious canal construction project in the nation's history. The Erie Canal would run from Buffalo, New York on the banks of Lake Erie, eastward to the Hudson River near Albany. The land that the canal would cross was virtually uninhabited, and only 10% of

the acreage had been cultivated.⁷² Through this New England wilderness the Erie Canal was to be built, primarily for the purpose of improving transportation so that a producer could ship his goods to market in a more safe and efficient manner.

During the six years of construction (1819-1825), a small group of eastern engineers "went to school" at Erie. None of them had ever done anything like this before, but they appeared to have learned as they worked. Several of the novice canal engineers traveled to England to examine the hundreds of mile of waterways that had been constructed there. From their observations in Britain, the Erie engineers took the Europeans' methods, and in many instances, improved them. Within the first six months of construction, for example, they discovered that the use of a plow and scraper was vastly superior to the European method of a spade and wheelbarrow. Three men using oxen or horses could excavate a mile of canal in a season, and the constant passage of men and teams made the banks more compact and less subject to later settling.⁷³

There were other technological advances made. Before the excavation work could actually begin, trees and stumps had to be cleared from either side of the canal to ensure solid ground. In the beginning this gruelling work was done with axe, pick and shovel. Eventually, a tree clearer was developed. This machine consisted of a large screw with a roller and a

⁷²Ronald E. Shaw Erie Water West; A History of the Erie Canal 1792-1854. Lexington: University of Kentucky Press, 1966, p. 93.

⁷³Ibid.

cable that literally tore the tree from the ground. A tree stump remover was also used. Huge wooden wheels and a wire coil allowed seven men and a team of oxen to remove thirty to forty stumps a day.⁷⁴ High wooden armed derricks were also used in excavating the canal bed. The derricks swung baskets into the canal which were then loaded with the rock that had been blasted away.⁷⁵

Engineers working on the Erie perceived the problems that could arise if their canal was not built with the best materials available. The engineers saw that the British had lined their canals with a layer of clay, using a technique called puddle. The Erie Canal was lined with the "blue mud of the meadows," which was apparently quite effective and readily available. A high grade of limestone was also used to line the facing on the locks of the canal.⁷⁶ New types of quick-lime cements were developed that hardened under water, and became increasingly hard with age.⁷⁷ The Erie Canal made use of only stone and iron, save for the trunks of certain aqueducts, which were made of hewed timber, one foot thick and covered with five additional inches of planks.⁷⁸ They sacrificed

⁷⁴Ibid.

⁷⁵Ibid., p. 130.

⁷⁶Ibid., p. 94.

⁷⁷Ibid., p. 95.

⁷⁸Ibid., p. 96.

expediency for quality work that would provide an efficient canal to serve the people of New York for generations.

The construction of canals in the Salt River Valley has, of course, had a much different history. The ancient Hohokam Indians, whose society seems to have peaked around 1400 A.D., took water from the Salt River through a sophisticated canal system which took advantage of gravity flow.⁷⁹ More than 450 years later, Jack Swilling oversaw the construction in 1868 of the first irrigation ditch in the Valley since the Indians' unexplained disappearance centuries before. Despite the fact that Swilling began his ditch nearly sixty years after the Erie Canal was begun, he did not go at the task with teams of horses and oxen, tree and stump removers, or any of the other technological achievements that were successfully applied in New York. Contrarily, the reports indicate that "fifteen men began digging;"⁸⁰ picks and shovels were the tools and human energy the motive force.

Two years later, in 1870, a small group of economically destitute Mexican farmers began to dig the San Francisco Canal. The San Francisco Canal probably had a rock and brush dam for a headgate into the Salt

⁷⁹ Alfred R. Golze', Reclamation in the United States. Caldwell, Idaho: The Caxton Press, 1961, p. 3.

⁸⁰ Salt River Project, "The Taming of the Salt," p. 14. This is a short little book that quickly sketches the lives of twenty-seven men who impacted the Salt River Valley.

River, which was customary for the times.⁸¹ The Mesa Canal, which had been a part of the Hohokam system that was rediscovered by the white settlers in the early 1870s, was dug and chipped out of the hard volcanic rock by hand.⁸²

Despite the fact that there had been an Industrial Revolution and the knowledge of canal construction since the Erie had vastly increased, men in the Salt River Valley were digging irrigation ditches by hand, using the methods of the ancient Indians centuries before. This meant that the canals were not sloped, aligned or constructed as well as the existing technology would allow. The Salt River ran high in 1874 and 1875 and canal heads, banks and dams were apparently washed away.⁸³

These problems were frustrating for the people attempting to settle and tame this section of the desert Southwest. Although the technology and expertise existed for constructing canals, its transfer to the West was slow. This was primarily due to a lack of capital and professional engineers in the region between the 100th Meridian and the California coast. When constructing their canals, the Arizonans did not have access to the type of capital investment that was available to the builders in the East. While the Erie Canal would be justified as an internal improvement, organizers of irrigation companies had difficulty showing an attractive

⁸¹Vernon Leonid Clark, "History of the Salt River Valley Water Users' Association," Salt River Project Archives, 1936, p.3.

⁸²Ibid.

⁸³Earl Zarbin, "Salt River Valley Canals."

return on investment. Most of the builders of the Salt River Valley canals were men with little capital or irrigation experience. There were few men there trained as engineers.

The irrigation ditches necessary to grow crops in the desert, however, did not have to be as soundly constructed as the transportation canals in the East. Yet there were economic consequences for the hastily built. Everyone in the Valley realized that they could not continue to reconstruct every time the river was high. They needed to construct more durable structures than they were building in the mid-1870s.

The Salt River Herald of March 30, 1878, gave voice to the call for a more reliable source of water diversion from the river. It said, in part, "[a]lthough almost any person of ordinary judgement can run out a ditch, it is advisable to use proper instruments and pursue methodical plans . . ."⁸⁴ Construction of the Arizona Canal, which began in 1883, began to use blasting, scraper teams, and other technological innovations that brought canal construction in the Valley out of the 15th Century.⁸⁵

There is a school of thought among economic historians that in the mid-19th Century, federal, state and especially municipal governments withdrew much of their support and direct participation from the promotion

⁸⁴Salt River Herald, March 30, 1878.

⁸⁵E. F. Young, "Early History of the Salt River Project," Salt River Project Archives.

of canals and railways.⁸⁶ This is entirely understandable when one considers the problems facing the United States during those immediate post-Civil War years. The void left by the assassination of Abraham Lincoln, and the troubled presidency of Andrew Johnson kept Washington D.C. in turmoil; Johnson's unpopular program of Reconstruction had the southern states crying against oppression; and lawlessness and Indian problems too often typified the situations encountered by those moving West.

In 1870, the population for all of Maricopa County stood at roughly three hundred thirty-five (335). The San Francisco Canal was a small dirt ditch in an underpopulated, barren stretch of sweltering desert valley. In light of the other problems facing the country, the washing out of the San Francisco, one poorly constructed dirt ditch outside the town of Tempe, Arizona, was not due a great deal of concern.

The dream of those first Mexican farmers was eventually realized, however. Their strong backs dug the trench; Michael Wormser modernized the structures; and Dwight B. Heard made irrigation work for agricultural and urban needs alike. The San Francisco Canal served as an integral part of the southside water distribution system for the Salt River Project into the mid-1950s. During those years freeway construction was begun near the canal, and the vast acreage of agricultural land was subdivided

⁸⁶Carter Goodrich, "American Development Policy; The Case of Internal Improvements." *Journal of Economic History* (16 December 1956), p. 449-460.

and urbanized. There are no longer any major water users along the banks of the San Francisco Canal, yet it still carries water, every 14 days in the summer and every 28 days in the winter, for home irrigation use.⁸⁷ Despite the hardships, reclamation of the desert was accomplished, and today the Salt River Valley is the thriving home of millions.

⁸⁷ Interview with Chuck Miller, Watermaster, Salt River Project, August 13, 1986.

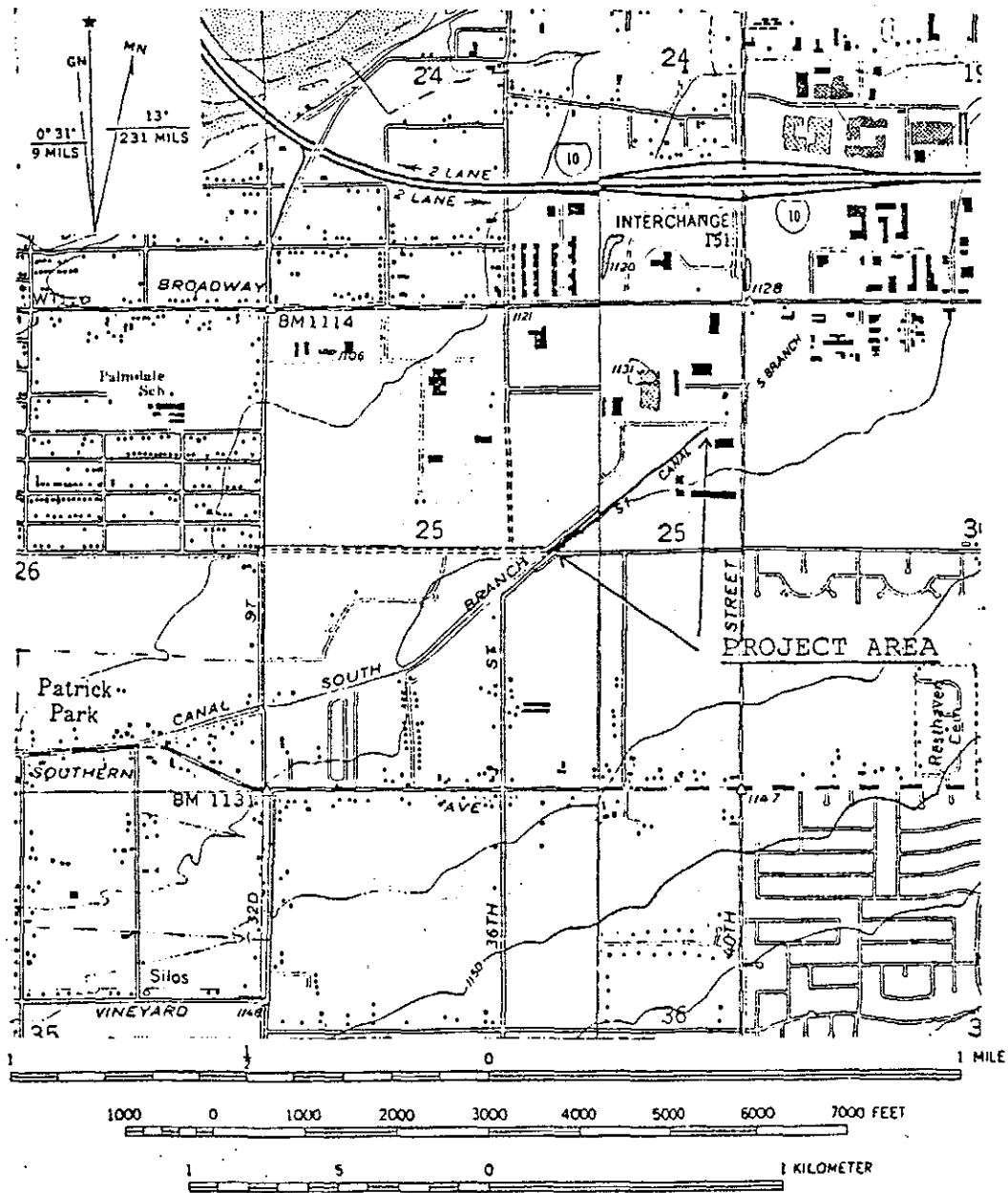
APPENDIX I

Map of the Tempe Canal System (circa 1902), reprinted from
Christine Lewis' article "The Early History of the Tempe Canal
Company," Arizona and the West, Vol. 7 No. 3 (Autumn 1965).

Tempe Canal System (circa 1902).

APPENDIX II

United States Geological Survey map of Tempe, Arizona,
detailing the documented section of the South Branch of the San
Francisco Canal.



APPENDIX III

Map F-10-20 of the Irrigation System and Properties of the Salt River Valley Water Users' Association. The documented section of the San Francisco Canal can be found in Section 25, Range 3 East, Township 1 North.

BIBLIOGRAPHY

I. Manuscript and Archival Collections

Arizona, Tempe. Arizona Collection, Arizona State University
_____. Salt River Project Archives, Salt River
Project.

II. United States Government Documents

United States Department of Agriculture, "Irrigation in the
Salt River Valley," 1900.

United States Department of Interior, Reclamation Service,
Annual Histories of the Salt River Project, 1911-1945.

_____. Annual Reports of the U. S. Reclamation
Service, 1902-1921.

_____. Salt River Project, Arizona, Final History to
1916. 3 vols., April 1916. (typewritten)

III. Newspapers and Magazines.

Phoenix, Arizona. The Salt River Herald.

_____. The Arizona Republican.

_____. The Phoenix Enterprise.

_____. Arizona Magazine.

IV. Articles and Other Papers.

Clark, Vernon Leonid. "History of the Salt River Valley
Water Users' Association," 1936. Paper prepared for the Salt
River Project. (typewritten)

Goldberg, Richard B. "Michael Wormser, Capitalist,"
American Jewish Archives (November 1973).

Lewis, Christine. "The Early History of the Tempe Canal
Company." Arizona and the West, vol. 7 No. 3 (Autumn
1965).

McClatchie, Alfred T. "Utilizing Our Water Supply,"
University of Arizona Agricultural Experiment Station Bulletin
No. 43. (Tucson: University of Arizona) July 28, 1902.

Mead, Elwood. "Report of Irrigation Investigations for 1900."
Washington D.C.: Government Printing Office, 1902.

Salt River Project. "The Taming of the Salt." (typewritten).

Salt River Valley Water Users' Association. Minutes of Board
of Governors, 1903-1975, (typewritten).

Zarbin, Earl. "Phoenix,: The Great Reservoir Chase Before
June 17, 1902." Paper prepared for the Salt River Project
(typewritten).

_____. "Dwight B. Heard: 'A Public Enemy.'" Paper
prepared for the Salt River Project (typewritten).

_____. "Salt River Valley Canals: 1867-1875."
Presentation text prepared for the Salt River Project
(typewritten).

V. Books.

Golze', Alfred R. Reclamation in the United States. Caldwell,
Idaho: The Caxton Press, 1961.

Shaw, Ronald E. Erie Water West; A History of the Erie Canal
1792-1854. Lexington: University of Kentucky Press, 1966.

Smith, Karen L. The Magnificent Experiment: Building the Salt
River Reclamation Project, 1890-1917. Tucson: The
University of Arizona Press, 1986.

VI. Dissertations and Thesis.

Lewis, Christine. "A History of Irrigation in the Tempe Area."
M. A. Thesis: Arizona State University, 1963.

Mawn, Geoffrey P. "Phoenix, Arizona: Central City of the
Southwest, 1870-1920." Ph.D. dissertation: Arizona State
University, 1979.

Smith, Karen L. "From Town to City: A History of Phoenix,
Arizona, 1870-1912." M.A. Thesis: University of California,
Santa Barbara, 1978.